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Do entrepreneurial knowledge and innovative attitude overcome “imperfections” in the innovation process? Insights from SMEs in the UK and Italy

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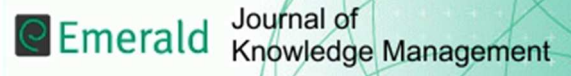
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**DO ENTREPRENEURIAL KNOWLEDGE AND INNOVATIVE
ATTITUDE OVERCOME “IMPERFECTIONS” IN THE
INNOVATION PROCESS: INSIGHTS FROM SMEs in UK and
Italy**

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Abstract

Purpose

On the basis that entrepreneurial knowledge spurs innovation and, in turn, generates a competitive advantage, the research seeks to explore the key “imperfections” of innovation process due to the dynamic, current technological progress in the knowledge intensive sector. The “imperfections” identified in risk management, asymmetric information in the knowledge management process, and hold-up problems, can all disrupt collaborative partnerships and limit opportunities for innovation.

Design/methodology/approach

By offering a case study analysis on two small to medium enterprises one operating in the United Kingdom and the other one in Italy, the study explores three key imperfections: risk management, asymmetric information in the knowledge management process, and hold-up problems which occur in the innovation process.

Finding

The entrepreneurs face these imperfections by adopting an open innovation model. Notwithstanding both entrepreneurs had to deal with all “imperfections”, their skills attributes, attitude, and aptitude allow them to grow their business and continually develop new products. Therefore, the imperfections do not limit the innovative capacity of an entrepreneur but rather enhance their challengeable attitude. In this regard, the case studies induce a further analysis on entrepreneurial knowledge intertwined with entrepreneurial risk management and networking skills.

Research limitations/implications

The empirical significance of two cases does not allow theorization. However, the research offers interesting results which can be strengthened by a comparative case study with other countries or deep investigated by a quantitative approach.

Originality/value

By leveraging entrepreneurial knowledge the imperfections noted in the innovation process can be overcome. Entrepreneurial knowledge is recognised as the main asset of an enterprise if it is combined with external talent or human resources. Entrepreneurs aim to develop innovative approaches and ideas through establishing both formal and informal collaborative partnerships relationships which are employed thanks to the entrepreneurs’ networking skills, knowledge, and abilities.

1. Introduction

By living in the world of the digital era where intangible assets are predominant, entrepreneurial knowledge is considered the main asset for a business (Burns *et al.*, 2011; Swart and Henneberg, 2007; Øystein Widding, 2005; Wiklund and Shepherd,

2003; Jones *et al.*, 2003). Knowledge is of value to an entrepreneur and when it is integrated and stored within an enterprise, it becomes an entity capacity which is also defined as a “mutually dependent knowledge system” (Leonard-Barton, 1995, 595 in Øystein Widding, 2005; see also Nonaka, 1994; Huber, 1991). Most commonly noted in large companies and less notable in small to medium enterprises (SMEs), knowledge leverages a competitive advantage (De Boer *et al.*, 1999; Gomezeli and Antončič, 2008). SMEs are less structured due to the lack of a formal knowledge management procedure, lack of tangible resources, and lack of access to advanced new technologies (Nunes *et al.*, 2006). This can generate “imperfections” in the development of new innovations. These “imperfections” are identified in risk management, asymmetric information in the knowledge management process, and hold-up problems (Zsidisin and Ellram, 2003; Smith, 2003; Moore, 1983; Liebenberg and Hoyt, 2003).

SMEs tend to apply an informal approach to transfer, integrate and store knowledge. In this case, knowledge does not reside just in an individual person but it is originated collectively within an enterprise (Spender, 1992; 1994). It is derived from a conversion of entrepreneurial knowledge to organizational culture. With this in mind, Swan *et al.* (1999) retain that knowledge is formed by facts, experiences and rules that people share within an enterprise. As entrepreneurial knowledge is intellectual capital, it sits in every single member within an enterprise. However due to the high cost to generate, share, convert, and store knowledge, SMEs can be “vulnerable to knowledge leakage and consequent losses in efficiency, productivity and competitiveness” (Nunes *et al.*, 2006, 103). This occurs mainly in knowledge intensive SMEs because their competitive advantage relies on the intellectual capital of individuals. In contrast to this labour-intensive and capital intensive SMEs, knowledge intensive SMEs dedicate less effort on the possession of intangible assets but they are more focused on building relationships with customers, suppliers and other external stakeholders from which they can acquire and update their existing knowledge (Alvesson, 1995).

Commonly knowledge intensive industry seems to emphasize the relevance of employing entrepreneurial knowledge to the organizational environment and shares this with their external network (Egbu *et al.*, 2004; Nordhaug, 1993; Leonard-Barton, 1995; Zhao and Wang, 2015; Scuotto *et al.*, 2017a). They have a clear need for more knowledge and expertise which are acquired by establishing new relationships with external partners (Del Giudice *et al.*, 2017b; Smith and Fischbacher, 2009; Scuotto *et al.*, 2017b, 2017d).

However, nowadays knowledge intensive SMEs have to face up to multiple market imperfections in the development of an innovation process. These include moral hazard, effort provision, entrepreneurial risk management (ERM), asymmetric information, and hold-up problem (Zsidisin and Ellram, 2003; Smith, 2003; Moore, 1983; Liebenberg and Hoyt, 2003). The literature does not offer a deep understanding on this phenomenon. Therefore, in focusing on some of these “imperfections” such as hold-up problem, ERM, and asymmetric information, this research examines the impact of these issues on the innovation process.

Success or failure thus may depend on companies managing such imperfections and consequently the relationship with their own sellers by employing a combination of entrepreneurial knowledge and external collective knowledge.

Therefore this study seeks to analyse how such combinations can spur innovation within knowledge intensive enterprises by offering two case studies of SMEs: one based in Italy and the other one in UK.

Entrepreneurs are highly motivated to carry out innovative initiatives collaborating with external actors such as customers, suppliers, other business, etc. since they collaborate in a scenario characterized by high - risk equilibrium and partially private information.

On this basis, the research aims to shed light on the key “imperfections” that may occur during the innovation process, limiting the development of a new product and comprising improvements in technology that render current technology and development efforts obsolete (Robertson and Gatignon, 1998).

In a nutshell, the research aims to answer relevant questions concerning boundaries of an entrepreneur (Coase, 1937; Williamson, 1985; Grossman and Hart, 1986; Hart and Moore, 1990). In addition the analysis of “imperfections” in the innovation process has been fruitfully applied to many relevant economic topics which are no longer restricted to the theory of SMEs. This research, thus, complements existing studies on innovation theory offering two narrative entrepreneurial journeys and showing a different view on the borderless nature of entrepreneurial knowledge.

2. Theoretical Framework

Entrepreneurial knowledge within knowledge intensive SMEs

Knowledge intensive SMEs depend on the knowledge belonging to each employee who brings to the enterprise entrepreneurial knowledge in the form of new and innovative ideas. This kind of SME relies heavily on specific individuals due to their lack of specialized human resources (Nunes *et al.*, 2006). SMEs soon realise the necessity of establishing external relationships to share and exploit talented resources and knowledge (Prichard *et al.*, 2000; Srikantaiah and Koenig, 2000).

The creation of new technologies has enforced the entrepreneurial attitude of exploiting external opportunities to generate new business ideas (Schumpeter, 1934).

This thus evokes a sense of alertness to discover new opportunities (Kirzner, 1973, 1979; McCaffrey, 2014).

“This means that entrepreneurial discovery is not a pure bolt from the blue” (Minniti, 2004, 641) but it is generated from a nexus of new and existing knowledge. An entrepreneur is attentive to a new discovery (Hayek, 1952) which evokes a new opportunity. Entrepreneurs’ discoveries are converted into innovations which are continually adjusting to the ever - changing market. Entrepreneurs’ actions are also adaptive to new trends (Knight, 1921). Baumol (1993), in fact, declares that entrepreneurs operate through ‘innovative entrepreneurship’ where their dynamism guides their proactive response to external events no matter their complexity, learning by doing and molding the environment to get benefits (Minniti, 2004; Rowley, 2000). Schumpeter (1934) argues that entrepreneurship is derived from the creative combination of resources into something recognized as being new to the market.

Entrepreneurial knowledge is a multivariate of skills, ability, capacity and know-how which predominantly requires a collaborative approach to obtain a competitive advantage (Chrisman, 1999; Premaratne, 2001)

However, in the current complex and dynamic scenario innovation is born from the unknown which involves uncertainty, originated by the ‘imperfections’ of the technological change (Harvey, 1989).

The three main “imperfections” which may occur in the innovation process

From this scenario emerges the entrepreneurial nature of being a risk taker to increase average profits (Schumpeter, 1934; Palich and Bagby, 1992). Yet the entrepreneurs’ success is connected with their perception of risk (Sarasvathy *et al.*, 1998).

Entrepreneurial knowledge is strongly embedded in the social activities that help to overcome these ‘imperfections’ and open its borders. These imperfections are identified in entrepreneurial risk management (ERM), asymmetric information, and hold up problem.

Specifically, the ERM arises due to widespread phenomenon such as globalization, technological change, and deregulation, among others (Jablonowski, 2001; Miller, 1992; Lam and Kawamoto, 1997; Miccolis and Shah, 2000). This risk is made up of a combination of internal and external factors which forces the entrepreneur to manage inefficiencies and generate income (Weerawardena and Mort, 2006). The ways in which such risk is overcome have been changing due to different trends and there has been a shift from a silo-based approach to a collaborative tactic as entrepreneurs become more strategic (Meulbroek, 2002). This is due to the advancement of information technology and the increasing availability of external resources. Entrepreneurs tend to face ERM in a collaborative way and generate more innovation even when there is a lack of economic, technological and specialized human resources (Weerawardena and Mort, 2006; Miccolis and Shah, 2000). Managing the ERM, as part of an entrepreneurial strategy, allows the maximization of shareholder value and the reduction of earnings volatility (Lam and Kawamoto, 1997; Meulbroek, 2002).

Thus, while individual risk management activities can reduce earnings volatility from a specific source (hazard risk, interest rate risk, etc.), an ERM strategy reduces volatility by preventing the aggregation of risk across different sources (Hisrich and Ramadani, 2017).

The asymmetric information in the process of knowledge management has been considered another factor to deal with when attempting to create innovation. By adopting a collaborative and adaptive approach, the knowledge is disseminated among different agents and so the asymmetric information emerges (Anderson, 1999). The asymmetric innovation does not bring only negative outcomes, but it also spurs an entrepreneur to search for new opportunities (Steyaert and Hjorth, 2003). Entrepreneurs are highly motivated to connect with a multi-varied range of external actors. Asymmetric information is, thus, considered a catalyst to establish new relationships even though knowledge gaps can occur. (Del Giudice *et al.* 2017a, 2017b; Mishra *et al.*, 1998; Newey and Zahra, 2009; Saviano and Caputo, 2013; Saviano *et al.*, 2014). By reducing this gap, entrepreneurs create an efficient market and make contractual relationships as a form of negotiation which monitor borrowing and lending activities in order to achieve relational balance (Jensen and Meckling, 1976). A contract, in fact, could motivate each party to exploit external talent and knowledge so as to improve the innovation process.

In addition, property rights and patents could encourage companies to build new external relationships and invest in new research ideas. For example, an entrepreneur may aim to manage the asymmetric information in the process of knowledge management by patents and copyrights. In fact as stated above, property rights and patents stimulate entrepreneurs to generate new ideas.

However on a different note patents can also generate a contractual hazard (e.g. hold-up problem) in the controlling of resources held by the external partner (Audretsch *et al.*, 2009). This can create a delicate situation which could curtail the ability of the entrepreneur to seek opportunity (Ireland *et al.*, 2003). Pivotal to this aspect is the entrepreneur's approach to leadership which can help them exploit market opportunity and manage the collaboration with the external environment.

3. Methodology: Two explorative case studies

Knowledge intensive small to medium enterprises have received an increasing amount of attention from scholars due to their capacity to enhance economic growth and create new jobs (Storey, 1994; Rickne and Jacobsson, 1996; Jones-Evans and Westhead, 1996; Mason and Harrison, 1999).

In order to offer a qualitative analysis on the effect of entrepreneurial knowledge on overcoming "imperfections" during the innovation process, study conducts an empirical, explorative research on two case studies of knowledge intensive SMEs are presented (Johnson *et al.*, 2008; Yin, 2013). The first SME is based in the United Kingdom with the second based in Italy. The case studies support new quantitative research and offer a better understanding of a complex phenomenon (Punch, 1998).

Both SMEs operate in the Information Communication and Technology (ICT) industry providing the health sector with innovative and technological services. Each company is based in a different country: the SME named "Kestros Ltd" is located in Glasgow, Scotland (UK), whilst the other SME labelled "Innovation group Ltd" operates in Isernia (Italy).. These two countries are considered suitable for this research for two reasons: first of all, entrepreneurial culture is strongly embraced in both countries (Hall and Hubbard, 1998). Secondly, a sustainable endogenous economic development culture is promoted so as to offer a business – friendly market (Eisenschitz and Gough, 1993). This has resulted in a greater emphasis on external collaborations which assume a key role in the development of the Italian and British economy (Bachtler and Clement, 1991). This approach promotes innovation through the combination of external factors that an entrepreneur tends to exploit for their own benefit.

In line with this scenario, both SMEs were selected taking in account the following criteria:

1. Knowledge intensive sector (Doherty, 1999; Martins and Alves, 2010);
2. Entrepreneur's propensity to generate innovations and face the market risk;
3. Entrepreneur's willingness to adopt an innovation approach (Burns *et al.*, 2011; Swart and Henneberg, 2007; Øystein Widding, 2005; Wiklund and Shepherd, 2003; Scuotto *et al.*, 2017b, 2017c).

The selection phase lasted more than six months because some SMEs were hostile in revealing their issues or some of them had not faced up the all three imperfections. Despite this two SMEs which reflect perfectly the research scope were identified.

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These two case studies are analysed by a standard qualitative technique, *id est* an interview. The interview is considered a valid technique to examine in depth issues and stimulate further research. The interview was composed of twenty six open – ended questions structured against five measures: entrepreneurial knowledge and innovative attitude, external collaborative knowledge, entrepreneurial risk management (ERM), asymmetric information, and hold- up problem (Table 1).

Table 1.

Measures	Items	References
Entrepreneurial innovative attitude	How do you describe yourself; as pioneer, early innovator, or late innovator? What is your last innovation? How many innovations did you develop in the last 5 years? Did you adopt an innovation approach?	Burns <i>et al.</i> , 2011; Swart and Henneberg, 2007; Øystein Widding, 2005; Wiklund and Shepherd, 2003
External collaborative knowledge	Did you collaborate with any external bodies to develop an innovation? If so, with whom did you develop an innovation such as research centre, universities, government, etc.? Considering the idea that businesses “borrow” resources from other business and in the same time a company can “lend” resources and knowledge to research centers, consultancy groups, other organizations and universities amongst others, would you describe thus the collaboration that you had with an external body? If so, how did you manage this collaboration in terms of coordination, monitoring, and developing a new product?	Schumpeter, 1934; Meulbroek, 2002.
Entrepreneurial Risk Management	In the process of co-developing a new product, did you face risk management issues? If so, how did you deal with the partner? Did you use technological tools to monitor your partner? If so, which one(s)? Were you worried to share your info and ideas with the partner?	Lindblom, 1959, 1979, 1990; Lindblom and Woodhouse, 1993; Das and Teng, 2004; Genus and Coles, 2006; Borgelt and Falk, 2007; Bowers and Khorakian, 2014; Weerawardena and Mort, 2006; Jablonowski, 2001; Miller, 1992; Lam and Kawamoto, 1997; Miccolis

		and Shah, 2000; Meulbroek, 2002; Hisrich and Ramadani, 2017
Asymmetric information	This cycle of information gathering, analysis and management action is itself a form of risk management. Hence did you overcome the asymmetric information? If so, how did you manage it? Did you request any a control rights (copyrights and patents)?	Gallini and Wright, 1990; Beggs, 1992; West <i>et al.</i> , 2014
Hold up problem	Did you overcome this imperfection? If so, how did you deal with it? Did an open innovation approach help you to overcome the hold-up imperfection? Did you use any instruments of ‘governance’ of inter-company relations such as long term contracts, sharing ownership of dedicated assets, mutual dependence by mutual investment in dedicated value?	Audretsch <i>et al.</i> , 2009; Ireland <i>et al.</i> , 2003; Williamson (1975; 1985). Alchian <i>et al.</i> , 1978; Grossman and Hart, 1986; North and Weingast, 1989; Hart and Moore, 1990; Shleifer and Vishny, 1997; Rogerson, 1998.

The Case Study: Kestros Ltd

Name of the Company: Kestros Ltd	Year of foundation: 2009
Founder: Manjit Mooker	Industry: Information Technology Consultancy Activities
Location: Scotland, UK	Business Structure: Private Ltd Company
Size (n. employees 2016): about 5	Revenue/Sales: (2015/16) 200k
Products/service: Consultancy services and software sales.	
Customers: National Health System (NHS)	
Main motivation for starting a company: empower patients with a digital solution in the form of an app which would allow them to access to their own information and manage their own appointments and other aspects of their care in a single digital location	
Name and role of the interviewees Managing Director and Project Manager	

The company Kestros LTD was founded in 2009 by Manjit Mooker in the United Kingdom and was sold in 2014. The company that bought it over retained the entrepreneur for two years to run the project then he left to start a new business.

The founder identifies himself as ‘a disruptive early innovator’ because his stated vision was to “change the face of healthcare”. In 2013 with the clear growth of mobile usage Manjit recognised an opportunity in the area of outpatient management for an application with the capability to empower patients with a digital solution in the form of an app which would allow them to access to their own information and manage their own appointments and other aspects of their care in a single digital location. After carrying out time and motion studies around patient throughput within various sectors of the NHS he was able to both confirm that a gap existed and also convince the Health Board that this opportunity was worth exploring further. The product itself was called “Mi Checkin”; an outpatient management app which the patient can download free from the App Store which allows the patient themselves to make, confirm or reschedule appointments, provides prompts for patients about their appointments and uses GPS to guide patients through the physical environment of the hospital in addition to other features. Whilst, as can be seen, there are clear benefits of this innovation for the care provider the product was designed with the patient in mind and improved patient experience was the key driver throughout the innovation process. The key benefits of the product include;

- It delivers significant time savings for the hospital using the app at all stages of the process.
- It reduces the amount of missed and cancelled appointments thus saving considerable financial expense for the NHS.
- It improves customer experience and satisfaction rates by allowing them to manage key aspects of the process themselves and integrating and coordinating information they receive in terms of their care package such as; appointment times, travel directions, car parking, patient check in, updates of delays etc. through their mobile phone or tablet.
- The app delivers the equivalent of 3 to 4 Full Time Equivalent reception staff which equates to around £100k savings per year for the hospital.

Entrepreneurial Knowledge and Innovative Attitude

Having discovered the gap in the market and identified market opportunities, the entrepreneur decided to change traditional attitudes, cultural norms and ways of doing things within healthcare in order to develop a customer centred product which has the potential to completely disrupt the market in this sector. The entrepreneur confirmed that he adopted an open innovation approach stating;

I did adopt an open innovation approach. I took processes within the health care sector and combined these with the patients' own mobile technology on a consent-based basis and integrated other features such as mapping and GPS technology which already existed and combined them in an innovative way to create a completely new product. Features of mobile device technology which offered potential benefits for the patient were exploited at every stage of the process and without the adoption of an open innovation approach the product could not have been developed and delivered to market.

External Collaborative Knowledge

This innovation was generated through the collaborations with the external environment. As he puts it:

In order to developing the product and bringing the product to market I had to collaborate with a diverse range of stakeholders which were external to my own business such as; Scottish and English Health Boards, GPs, The Care Quality Commission, Primary Care Trusts and Patient representative bodies however there was no collaboration with research centres or universities as I was able to provide the resources I needed myself without needing to think about bringing in those types of organisations. Each stakeholder involved in the project had their own agendas and priorities which created a huge range of barriers to the innovation process, the extent of which, I feel I grossly underestimated. Whilst initially I believed that I did not need to develop networks and relationships I soon came to realise as a result of going through the innovation process that I should have spent a lot more time developing relationships in order to overcome these barriers and build rapport and trust especially in the early stages of the process. This would, in my opinion, have allowed the product to be delivered to market much sooner.

Whilst the entrepreneur was willing to develop external collaboration, he was at times demotivated by significant bureaucratic barriers which needed to be overcome such as:

- Public procurement procedures;
- Data Processing Agreements;
- Internal instruments of governance;
- Contract terms and agreements;
- Policies governing integration of systems with external partners;
- Governance around information. There is a culture of protectionism around patient data – The hospital viewed themselves as the “guardian and protector of the patients’ information”;
- Ambiguity around ownership of data. The patients’ information is their property but if a GP writes a report then there is a question around whether the GP owns that data.

Some of these barriers can be categorised as ‘imperfections’.

Entrepreneurial risk management (ERM).

Regarding the ERM, Manjit claimed that:

There were some issues around getting access to the Hospital and wider NHS systems in order to integrate the product systems both from a bureaucratic point of view and because they had never done things before in the way I wanted and needed them to be done. In some instances what I wanted to do could not be achieved as the obstacles were too high and other innovative solutions needed to be developed. For example I was not permitted to directly access the Hospital Intranet so a parallel system was developed which worked around this problem. Inversely there were also some issues around sharing of information where I felt the need to protect myself. For example I was asked to provide commercially valuable information relating to how my technology was set up and operated which did not impact on the project and which in the end I declined to provide. In terms of risk the risk management process was both ad hoc and evolving and at times I adopted a “seat of the pants approach” and had to think on my feet to come up with solutions to problems as they presented themselves. However as I gained more experience of the stakeholders and their needs and expectations I was able to better manage these risks which included;

- *Digital data breach, loss or theft for all parties.*
- *Management of costs in order to stay within budget constraints for all parties.*
- *Building, developing and maintaining trust in the product for the Owner.*
- *Reputational risk for stakeholders resulting from failure to deliver on promise.*
- *Negative publicity for stakeholders resulting from failure of the product.*
- *Management of expectations of end user.*

The potential outcomes of these risks for my Company could have been; loss of reputation, loss of contract, increased costs because of unforeseen delays and loss of future commercial opportunities.

Asymmetric information

Other problems were also experienced around information exchange which could be attributed not to a lack of trust but rather to miscommunication, misunderstanding or misinterpretation of instructions and expectations. In these cases the information was provided in good faith but could not be trusted. Manjit stated that:

There were no issues whatsoever around IP. I retained 100% of the intellectual property and I made it very clear at the beginning that I was not able to design a product specifically for the Hospital or Trust and that this product was designed for the patient themselves who were free to move between different Trusts and therefore the product should move with them.

Hold up problem

A contract was stipulated to avoid any contractual hazard, e.g. hold up problem. It set out the terms of the project and the key partner (a hospital) was used to dealing with external partners on a daily basis.

In this regard, the entrepreneur declared that:

Whilst I encountered challenges over an extended period of time which were significant at no time did I feel that I could not overcome them nor did I consider giving up. I will admit to being demotivated around the challenges especially at the beginning of the process where the greatest barriers to innovation were encountered but also in the final stages as I moved towards exit from the project. I feel that, looking back, of my total time spent on the project I spent 10% developing the actual product and 90% managing the innovation process in order to overcome barriers to market.

Case Study: Innovation group Ltd

Name of the Company: Innovation group Ltd	Year of foundation: 1998
Founders: Panetta Ernesto, Sergio Di Marco, Massimo di Marco, Alessio Antonilli and Giuseppe Picciano	Industry: Information Technology Consultancy Activities
Location: Isernia, Italy	Business Structure: Private Ltd Company
Size (n. employees 2016): about 12	Revenue/Sales: (2016/17) 400k
Products/service: Consultancy services and software sales.	
Customers: small-medium hospital enterprises	
Main motivation for starting a company Solving the dematerialization of document issues in the health industry	
Name and role of the interviewees Giuseppe Picciano - Managing Director and Project Manager	
The Main Partner: Mediterranean Neurological Institute, id est IRCCS NEUROMED	

Innovation Group is a limited company founded in 1998 by five members: Panetta Ernesto, Sergio Di Marco, Massimo di Marco, Alessio Antonilli and Giuseppe Picciano in the South of Italy, Isernia region.

This enterprise was established to bridge the gap in the market related to the dematerialization of documents in the health industry. This business did not receive a positive response from the local market and therefore the five partners decided to focus their activities on the tourism market, offering a professional email marketing service known as MailForAll which allowed them to grow and become the leader in the market.

Moreover a diversification strategy was applied to expand the core business of Innovation Group. The company started to look into the software industry, originating a new medical software known as Smart Box NOVAMED. Novamed has revolutionised the knowledge management system of the health industry, organizing, monitoring, and controlling all medical activities (from suppliers to customers) in a single platform. In particular it offers a global solution for small-medium hospital enterprises integrating in a single work environment all the applications necessary for the operation of the clinic. These functions range from the management of purchases and warehousing up to the clinical management of patients passing through all administrative and medical activities of the medical record and the provision of outpatient diagnostic procedures (under the health care scheme on behalf of the National Health Service or in private mode). In addition to this system, Innovation Group offers an efficient management of patients' medical information. This allows

users to monitor and control of operating room activities, radiological and laboratory diagnostic equipment, improving care and patients' satisfaction.

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Nowadays the Innovation Group is composed of 12 employees and its turnover is around 400K thanks its collaboration with one of the largest Mediterranean Neurological Institutes, id est IRCCS NEUROMED.

Entrepreneurial Knowledge and Innovative Attitude

Starting from a gap in the market, the five founders were encouraged to develop an innovative solution for the health system. One of the founders, Giuseppe Picciano declared that *an innovation approach was adopted. The product is made "on demand" identifying customers' specific needs and delivering a customized software and hardware system. Our core product is "smart box Novamed" with which we have positioned our company as the leader in the health software industry. We really aim to improve the health national system and therefore we believe that several improvements have been made thanks to our technologies.*

Thanks to their entrepreneurial, innovative attitude, Innovation Group generated several innovations in the last five years such as a microscopic video recording system, anesthetic drugs labeling system, histological examinations classification system, patient therapy management system, PAX, temperature remote sensing system and dematerialization system of active accounting documents.

External collaborative knowledge

Innovation Group's strength is based on a close collaboration with a corporate enterprise, IRCCS Neuromed. As one of the founders stated:

Yes. I collaborate with costumers, competitors, research centers, and clinician providers. To be honest, I do not always find an open mind there. My main customer is one of the largest Mediterranean Neurological Institute, id est IRCCS NEUROMED from which I acquire relevant information on the final customers and so therefore I develop a tailored product/service. There is a close collaboration with Neuromed based on trust and respect.

However notwithstanding the benefits obtained from this business relationship, Innovation Group has to face up a few "imperfections", as we can see below.

Entrepreneurial Risk management (ERM)

In relation to the ERM, Giuseppe Picciano affirmed:

Yes, we did face an entrepreneurial risk management challenge (ERM). Although we have a close collaboration with Neuromed, this risk is totally under our control Therefore we do not monitor our main partner. We also share all information production activities with our partner, except for production costs.

Asymmetric Information

This imperfection seemed to be solved thanks to a high level of trust and professional respect. as the interviewer asserted;

As I stated before, we share all information with our partner. There is a total trust of our business relationship which is our strength. Although we are also proceeding to request a patent for our technologies. The scope is to protect our intellectual property (IP) from other competitors rather than our partner.

Hold up problem

The Innovation Group has not had to face up an asymmetric information issue, a contract is made to save business rights of both enterprises. Giuseppe Picciano declared that *their main partner, Neuromed takes care of its employees' rights and if there is any technical problem, it is our problem to solve it. This increases the level of competition and therefore open the access to other enterprises. Linking to the ERM concept, we have a risk and hence we protect our business with a contract which usually lasts three years.*

So in summary the formal contract, the trust and an open innovation approach have been the key to their success coupled with their entrepreneurial attitude to continually introduce always new technologies.

Giuseppe Picciano goes on to say that *Innovation Group has been able to offer a knowledge management web solution, thanks to information exchange and an innovative approach with clients (Innovation Group is also an Aruba partner for electronic signatures). However these barriers which you call "imperfections" have never constrained us in developing innovations but they have motivated us to generating new solutions and therefore providing a high level of customers' satisfaction.*

Final Remarks

Imperfections such as entrepreneurial risk management (ERM), asymmetric information, and hold-up problem are all capable of interrupting collaborative partnerships and limiting innovation opportunities.

This research shows how entrepreneurs face these imperfections during the innovation process by employing their entrepreneurial knowledge and exploiting their attitude towards innovation.

Notwithstanding, both entrepreneurs had to deal with all "imperfections", their skills attributes, attitude and aptitude allow them to grow their business and continually develop new products. Hence, these imperfections do not limit their innovative capacity. In fact, Kestros Ltd was sold even though the business was profitable. The entrepreneur considered this action as an opportunity to further generate new innovations. Whilst, the Innovation Group Ltd business is still running and exploiting the "imperfections" by a collaborative approach with its ecosystem.

Whilst managerial literature has sanctioned that new relationships bring with it the risk of opportunistic behaviors; the protection of intellectual property is the appropriate deterrent to minimize the risk in terms of emerging strategy. In turn the entrepreneurs dominate all intellectual property right from the start and have to dedicate the prevalence of their time in the development of innovation. These behaviours arise from the perceived risks such as loss of reputation, loss of contract, increased costs because of unforeseen delays and loss of future commercial opportunities which Emphasizing the fact that the inability of an entrepreneur to stay abreast of technological changes has a negative effect on costs, competitiveness of products in the market and lead-times.

The current industrial conformation has made open innovation the only lever capable of generating innovation, in the absence of a phase of substantial initial investment.

Notwithstanding the interesting insights which emerged from the interviews, the empirical significance of these two cases does not allow theorization. Hence, it needs, for instance, further development of a parallel case for conducting a comparative survey. Alongside this, consideration should be made of the ERM linked to innovation by a cause-effect relationship, whereby scholars can examine innovative entrepreneurial behaviour adopted to minimize entrepreneurial risks. A further theoretical implication plays on the role of trust within the hypothesized conceptual framework. Entrepreneurial risk management and perception, as well as informational asymmetries, are less manageable when the level of confidence between counterparties decreases. From this a few queries have been raised: Are these imperfections originated in only SMEs or they may involve corporate enterprises? Are these imperfections considered barriers only in advanced countries or also found in emerging countries? If so, how are emerging countries equipped to overcome them? Can other forms of imperfections be examined? These questions, may stimulate further studies encouraging new debates on this phenomenon and therefore new practical views.

In summary, this research offers an in depth analysis of entrepreneurial knowledge and innovative attitude overcoming the aforementioned “imperfections”. The two SMEs adopt a different approach but neither has been discouraged in generating innovations. Consequently there is an opportunity to improve their innovation performance based on the fact that the combination of entrepreneurial knowledge and external collective knowledge enable SMEs to develop something new through the establishment of formal and informal relationships. This approach may resolve some imperfections such as the uncertainty associated with costs regarding delimitation of the boundaries of ownership. This also evokes the classic idea of the economic institution, id est enterprises are the nexus of contracts based on the process of borrowing and lending resources and knowledge to research centres, consultancy groups, other organisations and universities amongst others. Jensen and Meckling (1976) highlight the relevance of negotiations to exploit external resources and knowledge to efficiently operate in the market. For instance, in analysing the current economic scenario, a company makes a decision to create and buy or create or buy in reference to a need to buy the legal rights to be able to use technologies patented by others as a way of improving its own contractual position ex post. In fact, it decides to exploit external resources (either tangible or intangible) in relation to the prices of the components supplied, the delivery programs, and transaction costs. In this way, a company should discover where get those resources efficiently, make a contract in order to guarantee the effective transfer of the resources, learn and absorb externally sourced resources, and manage the inter-business relationships.

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